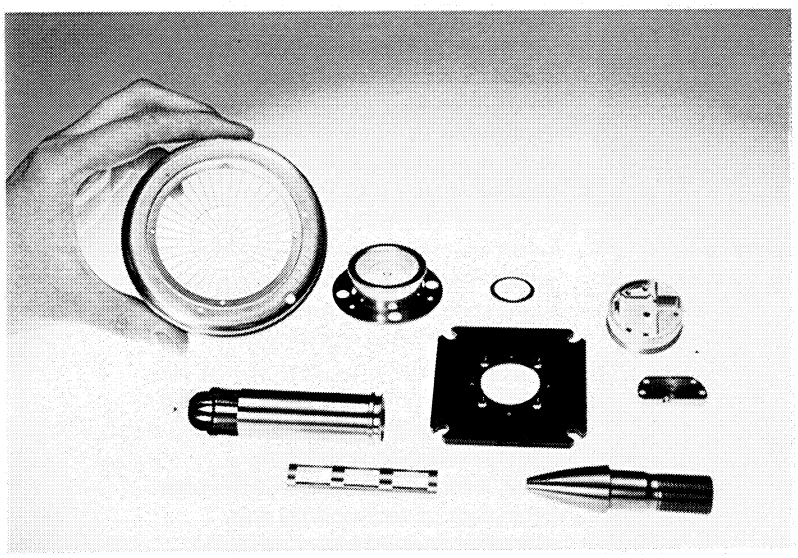
Thermionic Energy

In 1962, in the fledgling days of space flight, NASA teamed with the Atomic Energy Commission (AEC) to form a joint research and development organization known as the Space Nuclear Systems Office (SNSO), no longer extant. SNSO's job was to focus R&D activity in a specialized area: the use of nuclear energy for high power, high temperature space applications. Involved in the effort, in addition to AEC, where NASA's Lewis Research Center and Jet Propulsion Laboratory, Navy and Air Force research units, Los Alamos National Laboratory and a number of contractors.

One of the technologies SNSO sought to advance was thermionic energy conversion, the production of energy from a heat source—in this case, a nuclear source. SNSO contracted with a then-small company known as Thermo Electron Corporation (TECo), Waltham, Massachusetts, which had been formed a few years earlier specifically to develop thermionic energy conversion technology. Because thermionic conversion operates in high temperature applications, TECo's work for SNSO involved development of refractory metals—metals with high melting points, such as molybdenum, tungsten and tantalum. TECo developed processes for these difficult-to-work metals in the areas of machining, bonding, forging and swaging (tapering a rod or tube).



The expertise thus acquired triggered a major expansion of TECo. Broad interest in the company's metalworking abilities resulted in the creation—in 1964—of a Metals Division, which received a contract from Oak Ridge National Laboratories to develop further its machining and fabricating techniques. TECo's reputation for precision machining, hot metalworking and bonding spread from the U.S. to Japan, England and Italy.

TECo is today noted for its ability to produce many parts other companies would not attempt to make. The photo at left shows a sampling of Metals Division parts made of molybdenum, tungsten and other specialty alloys. At left below a technician is monitoring a numerical-control machining center that enables manufacture of precision parts in high volume. Below, Metals Division electrical discharge machines are used in production of military electronics systems, one of the division's largest areas of activity. TECo's know-how in working exotic metals resulted in a capability to manufacture bone implants, such as artificial hips made of cobalt chrome. The company's expertise in working tantalum has been applied to manufacture of heart pacemakers. The Metals Division has grown from six people in 1964 to 130 today, but it is a small part of what has become a major U.S. company with sales on the order of $250 million annually. Company officials acknowledge that TECo's expertise and reputation acquired in work for SNSO provided the basic impetus for this large-scale expansion.